STATE & PRIVATE FORESTRY
FOREST HEALTH PROTECTION
SOUTH SIERRA SHARED SERVICE AREA

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From: State and Private Forestry, Forest Health Protection, South Sierra Shared Service Area

Subject: 2016 Trestle Forest Health Project

Summary

Two separate field visits in August 2016 were requested Placerville Ranger District for FHP to view Trestle Forest Health Project. The first visit was accompanied by Don Errington (Pacific and Georgetown RD, Timber Management Officer); the second visit with Duane Nelson (Placerville District Ranger) and Dana Walsh (Pacific and Georgetown RD, Silviculturist), Roger Brown (Placerville Forester), and Jennifer DeWoody (Placerville NEPA Coordinator). Both visits were to assess current and at-risk bark beetle affected areas proposed for treatment as tree mortality had surged in the past year, with large groups of dead trees in WUI zones and wildlife PACs. With a forecast of another dry winter for California, the urgency for restoration treatments is heightened to mitigate potential for further widespread mortality.

Introduction

The Trestle Forest Health Project was initiated in 2011 (NEPA to be completed 2017) and proposes to treat 16,764 acres (of 20,453 acres total) (Appendix A for map). The project is composed of mature (pine) plantations and a multitude of natural stands that border private land. Within the Trestle Project perimeter, over 19,000 acres are categorized as Wildland Urban Interface, and 3,700 acres within the Defense zone for the community of Grizzly Flat along west border. There is a private camp (Leoni Meadows) and a few other large inholdings that add to its high visibility with public. Stand exams of the project find that a majority of project area is Sierra Mixed conifer forest type, with ponderosa pine comprising the next largest type (Silvicultural report, 2014). Elevations range from 3200 to 5800 feet. There is a mix of trees in variable age classes: understory ranges from 30-80 years, mature trees (mostly pines) from 130-400 years. Plantations were established from 1960 to 1990, currently dense with competing brush and natural regeneration. Some plantations have been previously thinned but still are moderate risk for insect infestation.

Four specific needs of the project are (Trestle DEIS 2014):

- Reducing fuel loading to reduce potential for catastrophic wildfire
- Improve forest health and restore forest compositions to be more resilient to disturbances
- Protect and perpetuate old-forest ecosystems, and associated wildlife species
- Improve transportation system in Trestle project to reduce undesirable sediment flow

Proposed project activities include commercial and non-commercial thinning, hand-thinning, prescribed fire, meadow restoration, road improvements, and debris piling. The silvicultural prescription options outlined for Trestle alternatives should help alleviate physiological stress of residual trees while providing some protection against bark beetles if implemented in a timely manner. Insect prevention treatments are often integrated with fuel reduction treatments (ex: thinning). However it should be noted that fuel targets or any treatment can fall short of forest health goals, if thresholds required for lowering bark beetle risk are not met.

Observations:

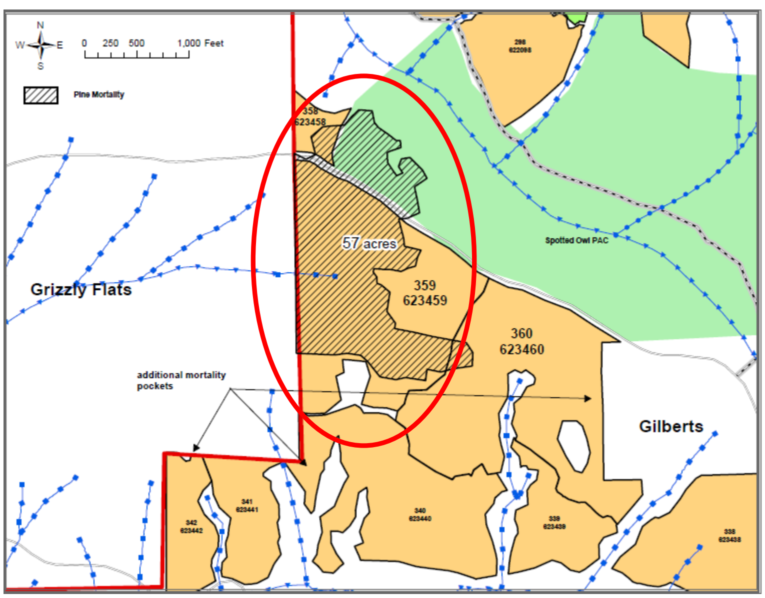
Bark and engraver beetles have been increasing in natural stands and plantations for the past several years on the Eldorado National Forest, as evidenced by groups of dead and individual trees detected by Aerial Detection Surveys (FHM, 2011-2015). To emphasize the widespread mortality that continues to build throughout the Forest, tree mortality jumped triple fold from 2014 to 2015 (Table 1). 2016 ADS has yet to be completed, but reports are already noting that mortality in the Sierra Nevada has intensified with 27 million trees reported killed so far (FHM, May 16, 2016 Highlights).

Table 1. FHM Aerial Detection Survey Mortality 2014-2015

Pacific and Placerville Ranger Districts	***Acres with some level of mortality***	***Estimated number of dead trees***
2014	15,042	31,000
2015	44,621	132,000

Since 2014, ponderosa pine mortality has been noticeably been building in El Dorado and Amador counties in the foothill and low-elevation forested zones. The district, public, and local govt agencies are concerned after witnessing the overwhelming mortality happening further south in Stanislaus, Sierra, and Sequoia National Forests. This year Amador County elevated the call to be added to the list of Local State of Emergency Counties in the CA, El Dorado County by 2017. Private landowners around and within the Trestle Project have been actively removing hazardous dead trees to provide safe corridors for traveling. Larger landowners such as Leoni Meadows are actively thinning, and state partners with the Trestle project have been reducing the roadside fuel loads and taking down hazardous trees in surrounding neighborhoods. Homeowners were observed cleaning up dead trees and debris around their lots. The need for collaboration and project integration at these landscape scales is supportive of the Regional Forester's ecosystem restoration message of "all lands" approach (Region 5, R5-MR-048, March 2011).

Field visits, landscape views, and aerial images confirm the growing number of dead trees observed in many areas dense stands in the project perimeter.   Below, a Google Earth® 2016 aerial image captures a growing mortality pocket on Forest Service land right at the eastern edge of Grizzly Flats; the map below shows ownership boundaries and location of mortality (Figures 1 and 2).   Other polygons with newly faded trees are easily observed in other areas within the project boundaries in the 2015 ADS.



Figures 1 and 2. (*Above*) Google Earth® image 2016 of recent ponderosa pine mortality just outside of Grizzly Flats. (*Left*) Map of mortality occurring within Trestle project boundaries.

Outbreaks typically occur when susceptible hosts are abundant, weather is favorable for successful beetle reproduction and survival, and other optimal circumstances exist that allow populations to flourish and expand over a short amount of time (Raffa et al. 2008). Large-scale bark beetle-caused mortality is not typical for forests in Sierra Nevada. However other notable outbreaks have happened in the past 100 years – most of them associated with years of below-average precipitation (Miller and Keen 1960).   In California, bark beetle-associated mortality often follow drought events and proliferate as long as the drought persists (Oblinger et al. 2011).

Current bark beetle activity in the Trestle Project can be categorized as “incipient epidemic”: rapidly building, with high potential to reach outbreak status if favorable conditions persist. Studies of mountain pine beetle populations found incipient epidemics are the beginning stages of an epidemic as estimated by the number of dead trees/acre annually for consecutive years (Safranyik 2003, Schmid et al. 2007). Most infestations are concentrated in the larger diameter classes which can be severely depleted once populations reach epidemic stage (Safranyik 2003). Other epidemic characteristics are mortality levels that continue increasing for 2-3 consecutive years, scattered infestations begin to coalesce, and number of dead trees per group intensifies (Schmid et al. 2007). Recognition of this stage also represents the opportune time to try and actively minimize further mortality (Schmid et al. 2007).

Management Options and Discussion:

Alternative 1: Do nothing.

Forests are dynamic and experience mortality at varying levels depending upon environmental conditions. Some tree death is required for forests to be cyclic and productive. Endemic levels of mortality are commonly rated as <1 tree per acre per year (Schmid et al. 2007). Other forest products and processes require nutrient recycling, coarse woody debris, and structural changes that dead trees provide. The diversity of trees, soil, and topography of California are natural population controls for many native insects. Natural processes and disturbances should be allowed to transpire and prevail without much interference if forests are functioning within their normal ranges of variability. However, public safety is a primary concern if mortality is creating hazards that pose high risks. Other project objectives may also be affected if high trees losses are expected: loss of dense overstory for wildlife, or rapid accumulation of fuel loads.

If drought persists and mortality continues unabated, it is likely that effects witnessed in southern Forests will eventually come to pass on Eldorado NF. On Sierra National Forest, an assessment of monitoring plots compared 2011 conditions to 2015 found over 1/3 of mixed conifer and pine forests are in a deforested[1] condition (Rojas 2015). Over 60% of ponderosa and sugar pines >15 inches were dead, ponderosa pines composing 51% and sugar pines 17% (Rojas 2015). A re-assessment in 2016 now found: ponderosa and sugars continued to die with <25% survivorship, and white fir and incense cedar mortality is now building – mostly in trees <20 inches (Pile et al. 2016).

Alternative 2, 4, or 5: Silvicultural (thinning) treatments.

Treatments that reduce stocking levels or densities below thresholds appropriate for forest type and site, will significantly reduce infestation risk of tree mortality from damaging insects. Thinning treatments at this stage of beetle outbreak in the Eldorado NF would be preventive, not suppressive. The objectives of preventive thinning would be to increase vigor and resistance of residual trees, thereby reducing attraction of bark and engraver beetles. Treatments that meet low thresholds of imminent mortality are at much lower risk for infestation, as they have more ability to adjust to drought conditions. Treatments that only partially meet thresholds such as those primarily for fuel reduction, may still be at high risk. Removal of dead trees would not necessarily affect beetle populations, but would alter microsite conditions that eventually redistribute limited resources for residual trees and vegetation, as well change wind patterns that affect pheromone dispersal (Egan et al. 2016).

Current stand conditions in many areas of the Trestle Project are at moderate to high risk to bark beetle infestations (National Insect and Disease Map, Krist et al. 2014). If forests are not altered from high risk conditions, bark and engraver beetle-associated mortality will likely continue. Percent mortality is consistently

[1] Region 5 defines deforested as experiencing >50% mortality.

shown to be much lower in stands with lower stocking or basal areas, particularly for pines (Oliver 1995, Fettig et al. 2007, Egan et al. 2011). If drought continues into a sixth year, trees that have so far tolerated drier conditions will most likely succumb to insect attacks.

A final alternative that was not mentioned in the EIS or silvicultural prescription are chemical treatments for high-value live trees. In administrative sites or near structures where dead trees may pose significant hazards, topical chemical treatments can be applied for short-term protection against invading beetles. Chemicals must be registered for use against specific bark beetles in California. Please contact Forest Health Protection for further details and recommendations.

Final discussion

While bark beetle mortality in the Sierras seem overwhelming, there are management actions that can be implemented that can significantly reduce the potential for further widespread infestation. The objective of pest management in large landscape settings is not to suppress or control populations, but minimize losses, provide public safety, and protect resources. Restoring forests back within the bounds of historical range of variability allows room to experience disturbance at sustainable, retractable levels. Healthy forests would be better positioned to rebound once adequate precipitation eventually comes. A change in weather is what may regionally suppress insect populations, but proactive management can hasten forest processes to more resilient and resistant adaptations as well as increase longevity of desired conditions. Proposed management actions for the Trestle project are strongly supported by FHP.

If there are any questions or more information is required regarding this report, please do not hesitate to contact Forest Health Protection.

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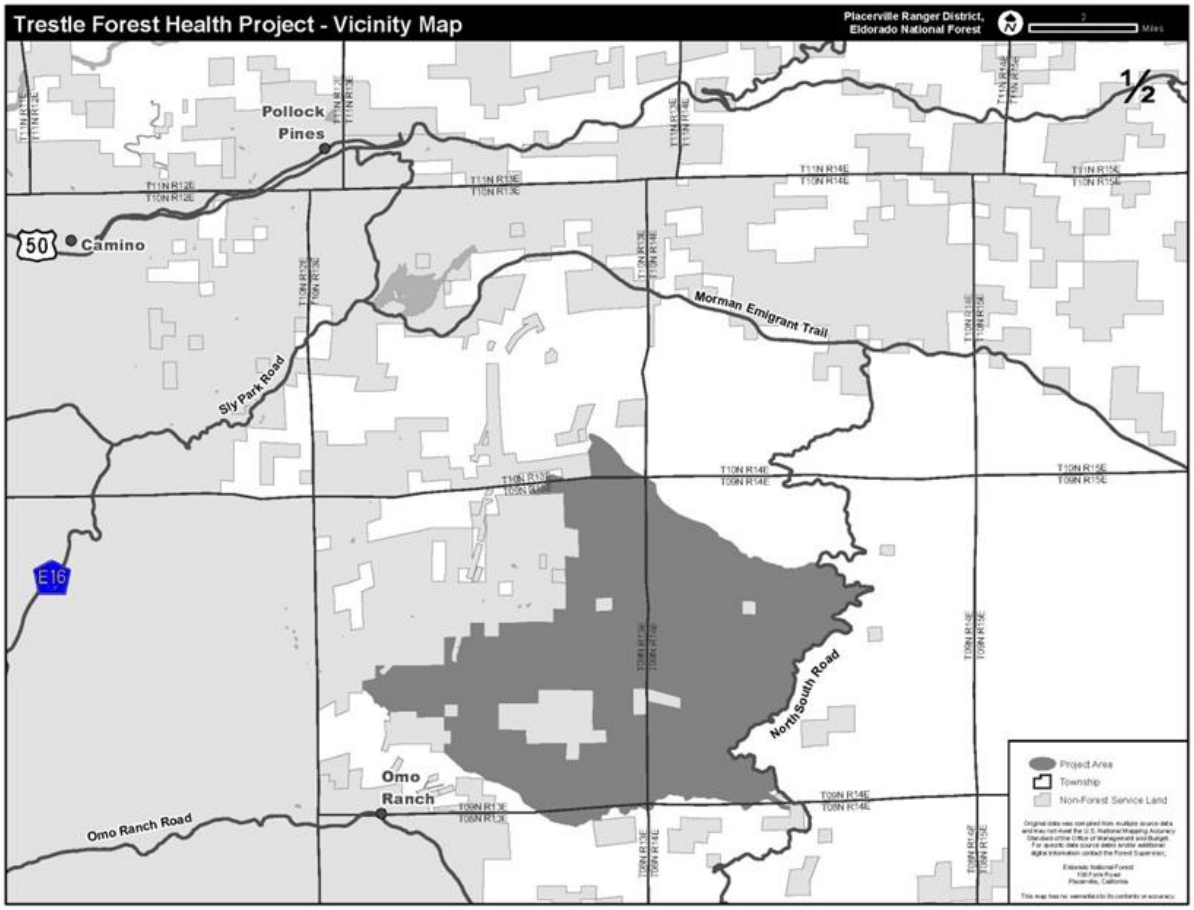
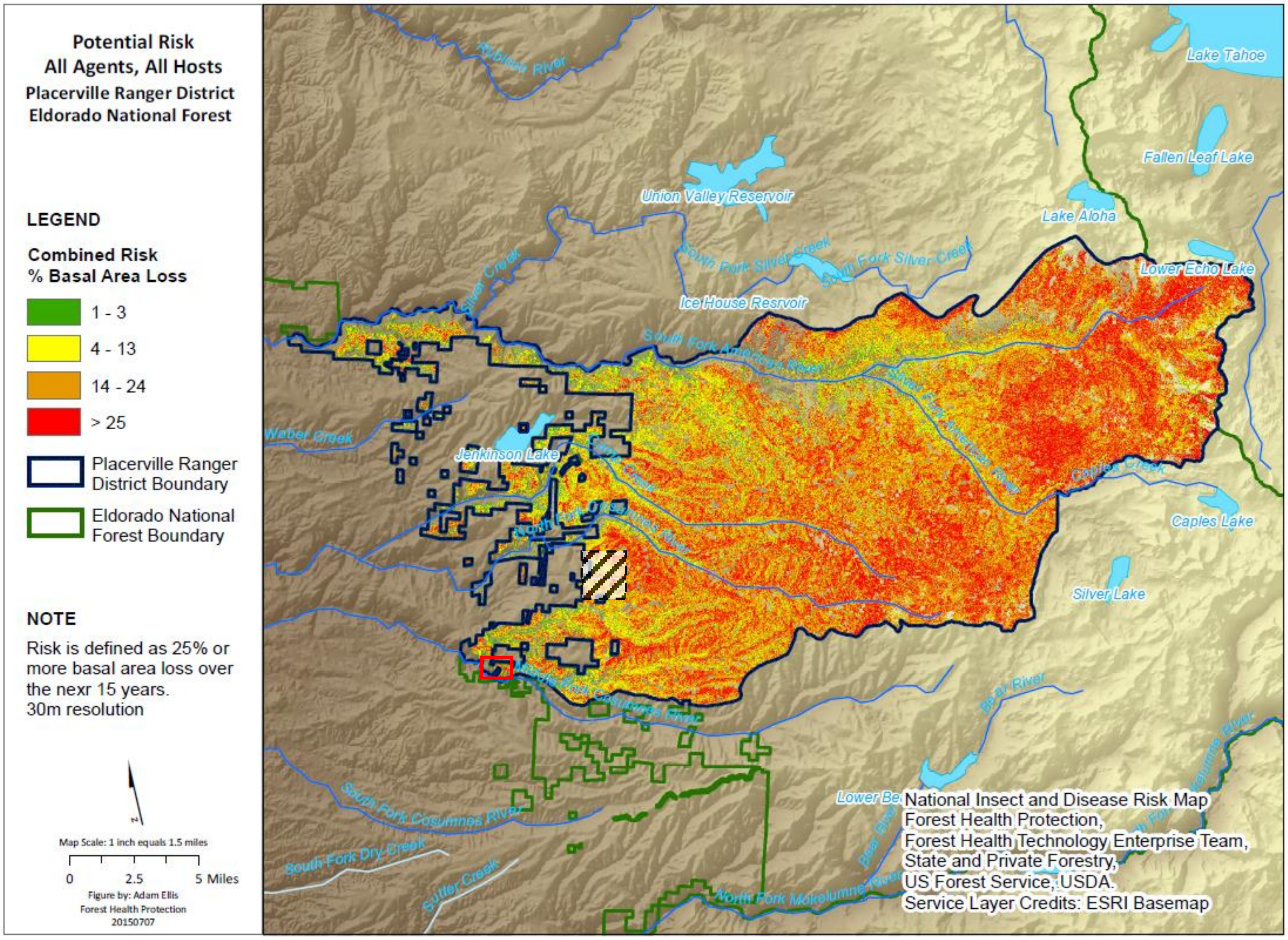
Appendix A. Map of Trestle Forest Health Project 2016, Eldorado National Forest, Placerville Ranger District.



Appendix B. Insect and Disease Risk Map of Placerville Ranger District (*generated July 2015*).



General outline location of 2016 Trestle Forest Health Project